

# ***Estuarine Shoreline Mapping Summit***

## **DECEMBER 4 & 5, 2007, BEAUFORT, NC**

The North Carolina Division of Coastal Management (DCM) conducted a workshop entitled the “North Carolina Estuarine Shoreline Mapping (ESM) Summit,” to begin the process of coordinating estuarine shoreline mapping efforts in North Carolina. The ESM Summit’s purpose was to discuss existing and future shoreline mapping initiatives and collaborate on methodology, resources, efforts, and needs. This summit brought together mapping staff managers and directors from a variety of state and federal agencies, academic institutions and NGO’s. The following pages provide a summary of the background and need for a delineated shoreline as well as results from the pre-summit survey and breakout session.

The overall goals of this workshop were to:

- Identify methodologies to ensure ESM project is used as a baseline for DENR agencies;
- Increase understanding about other estuarine shoreline mapping efforts in NC;
- Identify priority regions for mapping estuarine shoreline;
- Investigate and work towards opportunities to collaborate; and
- Identify resources to support mapping efforts.

### **Background**

Development of the barrier islands has reached near capacity and little open space remains. This, coupled with favorable economic conditions, a population surge in the 20 coastal counties (a trend that is expected to continue) and a desire for this influx of people to live on or near the waterfront, has created severe development pressures (as well as impacts to water quality, wetlands and other natural resources) along the estuarine shoreline. An understanding of how this development will affect the adjacent shoreline and its surrounding habitat requires the incorporation of the shoreline and its physical attributes into a temporal and spatial framework.

Unfortunately, estuarine shoreline assessment is tenuous at best, in part because a complete and accurate digital shoreline presently does not exist for North Carolina's extensive sounds and rivers (the largest semi-enclosed, lagoonal estuarine system in the world).

### **Shoreline Needs**

The creation of an accurate shoreline and its incorporation into a GIS-based spatial framework will provide a baseline that will allow DCM and numerous other government agencies, institutions, and organizations to monitor future shoreline trends. Identification of the physical features associated with each portion of this shoreline, coupled with trends in movement, will allow a better understanding of the physical and biological processes associated with the estuarine system.

A delineated shoreline would serve multiple uses for many agencies and stakeholders. Primarily, it would enhance our efforts related to natural resource management and planning, compliance and use-support assessments. In addition, it would provide more accurate field-based maps and database products and would be used to update the shoreline on NOAA nautical charts. The shoreline would help to better define shellfish harvesting closure areas and potentially be used to identify and designate Strategic Habitat Areas. Finally, a delineated shoreline could be used during the CAMA permit application review process and to support numerous academic research projects involving shoreline change, habitat response related to structures and shoreline type, and sea level rise.

In addition, a more detailed analysis of the modified portions of the shoreline (e.g., structures such as offshore sills, bulkheads, docks, and piers) will, for the first time, provide an estimate on how many miles of shoreline is modified and help determine how these modifications affect the estuarine system.

Monitoring changes along the estuarine shoreline allows the potential for new or updated management strategies, such as setback factors that can be tied to erosion rates, structure counts and/or shoreline type for development activities. The knowledge gained from a comprehensive estuarine shoreline delineation and characterization effort will allow for the assessment of existing management policies as well as the development of new rule language that will mitigate risk and provide resource conservation well into the future.

### **Next Steps**

As a result of this workshop, the following “Next Steps” were generated:

1. Form a management committee to discuss the needs of the project and then give guidance and direction to those creating the methodology standard.
2. Form a technical committee to determine a methodology standard.

DCM will be working to organize these committees and plan for them to meet in early 2008. If you are interested in participating further in the effort to map North Carolina’s estuarine shoreline, please contact Scott Geis, DCM Policy Analyst, at 919-733-2293 ext. 242 or [Scott.Geis@ncmail.net](mailto:Scott.Geis@ncmail.net).

# North Carolina Estuarine Shoreline Mapping Summit

**SPONSORED BY THE NORTH CAROLINA DIVISION OF COASTAL MANAGEMENT  
AND THE NORTH CAROLINA NATIONAL ESTUARINE RESEARCH RESERVE'S  
COASTAL TRAINING PROGRAM**

## Agenda

### **Tuesday, December 4, 2007**

- 10:45-11:00 Registration
- 11:00-11:15 Welcome - *Rebecca Ellin, Manager, N.C. Coastal Reserves*
- 11:15-11:30 Opening Remarks – *Jim Gregson, Director, Division of Coastal Management*
- 11:30-1:00 Pre-Summit Survey Results & Discussion – *Steve Underwood, Assistant Director of Policy and Planning, Division of Coastal Management*
- 1:00-2:00 Boxed Lunch – Bountiful Bagel
- 2:00-3:30 Breakout Sessions
- 3:30-3:45 Break
- 3:45-5:00 Continue Breakout Sessions

### **Wednesday, December 5, 2007**

- 8:00-8:30 Sign-in and Coffee
- 8:30-9:30 Breakout Session Reports
- 9:30-11:00 Matching Priorities with Next Steps
- 11:00-11:30 Evaluations and Closing Remarks

North Carolina Estuarine Shoreline Mapping Summit Participants - December 4-5, 2007

| <b>Last name</b> | <b>First</b> | <b>Position</b>                       | <b>Dept/Agency</b> | <b>Agency/Section</b>                | <b>Email</b>   |
|------------------|--------------|---------------------------------------|--------------------|--------------------------------------|--|
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## **PRE-WORKSHOP SURVEY RESULTS SUMMARY**

Participants were asked to complete an online survey two weeks before the workshop took place. The following is a summary of that survey.

### **1. Contact Information**

### **2. Are you a manager or a technician?**

| <u>Answer</u> | <u>%</u> | <u># responses</u> |
|---------------|----------|--------------------|
| Manager       | 59.3%    | 16/27              |
| Technician    | 40.7%    | 11/27              |

### **3. Does your agency map estuarine shorelines?**

| <u>Answer</u> | <u>%</u> | <u># responses</u> |
|---------------|----------|--------------------|
| Yes           | 53.6%    | 15/28              |
| No            | 46.4%    | 13/28              |

### **4. In which CAMA counties have you mapped estuarine shorelines? In which counties do you plan to map within the next year? Check all that apply.**

| <u>County</u> | <u>%</u> | <u># responses</u> | <u>County</u> | <u>%</u> | <u># responses</u> |
|---------------|----------|--------------------|---------------|----------|--------------------|
| Beaufort      | 57.1%    | 8/14               | Hertford      | 28.6%    | 4/14               |
| Bertie        | 35.7%    | 5/14               | Hyde          | 57.1%    | 8/14               |
| Brunswick     | 35.7%    | 5/14               | New Hanover   | 35.7%    | 5/14               |
| Camden        | 35.7%    | 5/14               | Onslow        | 35.7%    | 5/14               |
| Carteret      | 85.7%    | 12/14              | Pamlico       | 64.3%    | 9/14               |
| Chowan        | 35.7%    | 5/14               | Pasquotank    | 35.7%    | 5/14               |
| Craven        | 64.3%    | 9/14               | Pender        | 28.6%    | 4/14               |
| Currituck     | 57.1%    | 8/14               | Perquimans    | 35.7%    | 5/14               |
| Dare          | 71.4%    | 10/14              | Tyrrell       | 35.7%    | 5/14               |
| Gates         | 28.6%    | 4/14               | Washington    | 42.9%    | 6/14               |

### **5. In which bodies of water have you mapped estuarine shorelines? Check all that apply.**

| <u>Water Body</u> | <u>%</u> | <u># responses</u> | <u>Water Body</u> | <u>%</u> | <u># responses</u> |
|-------------------|----------|--------------------|-------------------|----------|--------------------|
| Currituck Sound   | 45.5%    | 5/11               | Pasquotank River  | 36.4%    | 4/11               |
| Albemarle Sound   | 36.4%    | 4/11               | Little River      | 18.2%    | 2/11               |
| Roanoke Sound     | 45.5%    | 5/11               | Perquimans River  | 36.4%    | 4/11               |
| Croatan Sound     | 45.5%    | 5/11               | Chowan River      | 36.4%    | 4/11               |
| Pamlico Sound     | 72.7%    | 8/11               | Alligator River   | 27.3%    | 3/11               |
| Core Sound        | 63.6%    | 7/11               | Long Shoal River  | 27.3%    | 3/11               |
| Back Sound        | 45.5%    | 5/11               | Pungo River       | 36.4%    | 4/11               |
| Bogue Sound       | 63.6%    | 7/11               | Pamlico River     | 54.5%    | 6/11               |
| Stump Sound       | 36.4%    | 4/11               | Neuse River       | 72.7%    | 8/11               |
| North River       | 18.2%    | 2/11               | North River       | 36.4%    | 4/11               |

| <u>Water Body</u> | <u>%</u> | <u># responses</u> | <u>Water Body</u> | <u>%</u> | <u># responses</u> |
|-------------------|----------|--------------------|-------------------|----------|--------------------|
| Newport River     | 36.4%    | 4/11               | Cape Fear River   | 45.5%    | 5/11               |
| White Oak River   | 27.3%    | 3/11               | Shallotte River   | 36.4%    | 4/11               |
| New River         | 36.4%    | 4/11               | Roanoke River     | 27.3%    | 3/11               |

**6. Select the methodology used to map the shoreline.**

| <u>Methodology</u>                                  | <u>%</u> | <u># responses</u> |
|---|----------|--------------------|
| Aerial orthophotography interpretation (digitizing) | 91.7%    | 11/12              |
| GPS-based field data collection                     | 41.7%    | 5/12               |
| Survey-based field data collection                  | 25.0%    | 3/12               |
| LiDAR-based interpretation                          | 41.7%    | 5/12               |
| Imagery-based spectral analysis                     | 33.3%    | 4/12               |

**7. If aerial photography interpretation was used, select the type, timing and scale of photography.**

(Number indicated specifies how many people responded to the specific item)

Type

- True Color – 5
- Multi Spectral – 5
- Black and White – 3
- Satellite – 1

Timing

- High Tide – 0
- Low Tide – 3
- Leaf On/Summer – 1
- Leaf Off/Winter – 2
- Pre-Storm – 0
- Post-Storm – 1

Source Scale

- 1:1200, 1 inch = 100 feet-Typical for County Tax Mapping in Urban Areas – 1
- 1:2400, 1 inch =200 feet-Typical for County Tax Mapping in Transition Areas – 2
- 1:4800, 1 inch = 400 feet - Typical for County Tax Mapping in Rural Areas – 2
- 1:4800 - 1:24,000, USGS Quads, High Resolution Satellite Imagery – 7
- 1:24,000 and greater, USGS regional maps, Satellite Imagery, Landsat – 2
- Other: Black and White Infrared at MHW and MLLW tide levels – 2

**8. If digitizing from aerial orthophotography, what is your typical digitizing (zoom) scale (e.g. 1:800, 1:1200, 1:2400, etc)?**

- 1:1200
- 1:1500 – 1:2200
- 1:500 – 1:3000
- 1:800

**9. What attributes do you collect for shoreline (e.g. structures, shoreline type, land use, land cover, habitats, etc)?**

- Land use, land cover
- Non-aquatic habitats, based on the NERR Habitat Classification Scheme
- None
- Shoreline Change Rate, Elevation, Land Cover, Fetch, Hardened/Modified Areas.
- Shoreline, docks, seawalls, piers, jetties, high water line, marsh
- Shoreline type, alongshore features (bridges, jetties, piers), obstructions (rocks, ruins, wrecks), dolphins/piles, landmarks, navigational aids (lights/beacons), structures (buildings/tanks/cables/levees/pipelines), roads/railroads, danger areas (ledge/reef)
- Collect attributes based on NGS' Coastal Cartographic Object Attribute Source Table (C-COAST) scheme.
- Vegetation cover, elevation, structures
- Elevation, vegetation

**10. Do you use estuarine shoreline data as part of your job?**

| <u>Answer</u> | <u>%</u> | <u># responses</u> |
|---------------|----------|--------------------|
| Yes           | 88.5%    | 23/26              |
| No            | 11.5%    | 3/26               |

**11. What definition of estuarine shoreline does your agency/organization use (e.g. MHW, MLW, land water interface, etc)?**

- MHW (5 responses)
- MHW and Normal Water Level (2 responses)
- Land Water Interface (2 responses)
- MHW, MLLW (2 responses)
- Undefined at this time
- MHW & Water Line
- Varies by Program
- Whatever is available
- MHW or apparent shoreline in marsh and swamp forest areas
- Unknown if there is an agency wide definition, but personally think it is somewhere between MHHW and MLLW.

## **12. How do you use estuarine shoreline data?**

- As indicators of stress to estuarine system.
- In defining our shellfish harvesting closures.
- As geographic content for the NC Coastal Reserve sites.
- GIS mapping for Shellfish Harvest Classifications
- Establishing Shellfish Closure Areas.
- To report beach mileage to EPA.
- CAMA Permit Application Review.
- Field/Base Maps, statistics and database development.
- Planning, compliance, use support assessment.
- Shoreline Change Rates and how these rates are related to various parameters (i.e. elevation, fetch, land cover).
- Base Maps
- Estuarine shoreline will be a component of several dataset facets developed for the NC Strategic Conservation Plan
- Mapping and classifying shellfish growing areas and mapping potential and actual pollution sources that may affect these growing areas for shoreline survey reports.
- Rules, proclamations, reports, analyses, many aspects of projects in the Division of Marine Fisheries.
- Advise shoreline owners on erosion management options.
- Academic Research
- To update the shoreline on NOAA Nautical Charts
- For Nautical Charting Purposes
- In support of research examining response of shoreline habitats to hardening and sea level rise, and to examine rates of sediment accretion and erosion associated with shorelines from a range of wave exposure settings.
- Detect elevation changes associated with shoreline structures, both natural (oyster reef) and man-made (sills, seawall).

## **13. What are your estuarine shoreline data needs?**

- Updated and accurate shorelines for establishing closure lines.
- Currently and consistently delineated shoreline with known definition (eg MLW). Updated at least every 5 years. Should be available at several scales: fine (approx 1:24,000), Medium (1:100,000).
- Accurate, updated shoreline layers
- Updated and accurate estuarine shoreline maps to assure accurate closure areas.
- An accurate detailed shoreline is needed everywhere shellfish do and can possibly exist for the DMF shellfish mapping program.
- An accurate, frequently updated, single data set used by all agencies.
- Currently (relative frequent updates to reflect changing conditions) consistency of production methods across different coastal areas, ability to integrate with stream mapping project data, should that program continue to be funded.



- Accurate shoreline data in order to delineate the landward boundary of shellfish growing waters, which then allows accurate acreage calculation of closed versus open waters.
- We would like to have most accurate shoreline and mean high waters for DCM coastal counties, counties with Marine Fisheries jurisdictional waters and CHPP/SHA counties.
- Anything I can get.
- Color and B&W IR aerial imagery at MHW and MLLW for entire area covered by NOAA nautical charts
- Comprehensive shoreline data would allow us to plan our research better, especially in regards to site selection, and also facilitate extrapolation of our results to wider geographic regions.

**14. What are the limitations and deficiencies of the estuarine shoreline data you currently use?**

- Accuracy and out of date due to changing shoreline conditions.
- 1) Too old for such dynamic conditions as our shorelines 2) Inconsistently “drawn” for different areas of the coast.
- GIS shoreline layer is not updated to reflect shoreline changes.
- Possibly out of date, inaccurate due to changing shorelines.
- Currently used shoreline are typically dated, inaccurate and at a smaller scale than needed.
- Inaccurate, out of date, and not used by all agencies.
- We are limited in available aerial photography, historical and current.
- Scale not fine enough and data not current enough
- Not up to date, doesn’t match more recent aerial photography.
- Not completed for state, digitized with latest imagery - over 12 years of imagery releases, digitized on an as needed basis.
- Usually non-existent
- US shoreline is not updated as frequently as we would like
- Need to update more frequently
- We map very small locations, site-specific research areas only.

## ***Estuarine Shoreline Mapping Summit***

### **BREAKOUT SESSION AND DISCUSSION RESULTS SUMMARY**

During the afternoon of December 4<sup>th</sup>, participants were assigned to one of four breakout groups as follows: Management Group #1, Management Group #2, Technical Group #3, Technical Group #4. These groups then met to answer a set of specific questions. The morning session on December 5<sup>th</sup> was a recap of the breakout sessions with one person from each group “reporting out” on their discussions and answers to the breakout questions. The following are the questions and answers discussed during the breakout sessions and report-out.

#### **Management Topics/Questions:**

**Question #1: What are your data needs? In addition to a digitized shoreline, what attributes would enhance your agency’s overall effort?**

Discussion from Management Group 1:

- Attributes for all agencies are infinite so it would be nice to just have an accurate defined coastline so everyone could reference the same thing and attach their own attributes that they use or collect. A more accurate coastline, however it is defined, would benefit several different agencies.
- Different agencies use a different definition of the shoreline for regulation purposes. If the shoreline is used for reference as a research or preparation tool, as long as the agencies all know what shoreline they are referencing (documented well in the metadata), they will be able to use it to their agency’s needs.
- 1:24,000 shoreline maps currently available aren’t accurate enough to work with anymore. The reconnaissance and preparation work we do before going in the field requires more accuracy than that.
- The final product should be in shapefile form and have lots of metadata to accurately document what shoreline is depicted and the methodology used.
- In regards to whether a continuous or noncontiguous shoreline would be better, even a noncontiguous shoreline would be better than what we have right now.

Discussion from Management Group 2:

- The final products should be in shapefile form with very good/complete metadata.
- The quality of data should be high resolution to the level of parcel scale.
- A long discussion was had on how we need to define what the shoreline is: mean high water (MHW), mean low water (MLW), mean lower low water (MLLW) and mean higher high water (MHHW) which are datum defined by actual tidal data using a gauge and apparent shoreline which is easily defined by physical data (in aerial photography).
- This process should ideally be completed on a regular cycle since the shoreline changes, (i.e. every five years or after a large event).
- Attributes vary by agency, but those specifically mentioned during discussions were: stormwater outfalls, ditches, shoreline structures (docks and marinas), and bathymetry.

**Question #2: Is a collaborative mapping effort feasible given organizational mandates? How can partners participate? (limitations/incentives)**

Discussion from Management Group 1:

- A collaborative effort is feasible, but conditional on availability of money and staffing.
- A defined methodology needs to be developed so that when an agency or institution “finds” money to put towards this effort, the effort doesn’t start over. The first step should be defining a specific methodology for the delineating of the shoreline that other agencies can follow if they are working on the effort for a different project as well.
- The local governments should be involved in this process from the start, because it gives them a tool to help them navigate rules based on a uniform dataset...would help with communications between agencies.
- There should be FIRST, an adoption of methodology standards and timeline for data production, while realizing time, resources, and money restrictions.

Discussion from Management Group 2:

- A collaborative effort is feasible, but conditional on availability of funds and resources. There are likely no resources to contribute though.
- A standardization of methodology for future flying options should be developed. A memorandum of understanding (MOU) like the one done for the SAV mapping may be a good example to follow.
- Other agencies can collaborate by contributing existing data collected by their agency or that they currently have in house.
- Potential partnerships and resources include: A LiDAR project will be going on spring of 2008 by NOAA in the OBX, a large aerial photo inventory and technical support from DOT, and the NOAA data explorer website has downloadable historical shorelines.

**Question #3: What would the next steps be in developing a collaborative effort?**

Discussion from Management Group 1:

- There is currently an advisory committee for the streambed mapping project. This group and their format should be reviewed for potential utilization.
- There should be more local government participation.
- A standard methodology should be developed on specific issues (i.e. where the shoreline is located, how or if to map ditches, coastal ponds, etc.).

Discussion from Management Group 2:

- Research should be done on who is mapping what, where, and how (including other states efforts). Then determine where the data is lacking and evaluate the different methodologies being used.
- The local governments (counties) should be involved in the effort.

- Develop stringent standards for methodology to produce a product of the highest resolution. We should be doing the best we can across the state since we already have low resolution shorelines.
- Develop definitions of shorelines. What are they and how are they mapped using aerial photography?
- Develop a working protocol for all aspects of the project (i.e. file formats, metadata structure etc). Consider building off a working protocol (i.e. NOS).

**Question #4: Is authority needed for collaboration across agencies/organizations?**

Discussion from Management Group 1:

- Although the streambed mapping project shows there is already authority in place, it is on its 3<sup>rd</sup> attempt to fund the coastal pilot project.
- Determine what resources are available to this effort.

Discussion from Management Group 2:

- Yes, within our organizations what we can contribute is dependent on the priorities of our organization.

**Question #5: What criteria should be considered when prioritizing the collection of this shoreline? Where should we begin and why?**

Discussion from Management Group 1:

- Criteria that should be considered include: areas of significant resources, and where other agencies/institutions are already working.

Discussion from Management Group 2:

- Criteria that should be considered include: areas with natural resources, port areas, population density, available imagery, and logical geographical pattern.
- Do we collect all the imagery up front or collect it as the project progresses?
- It may be possible for one agency or group to develop the shoreline “line” and another agency or group work on the attributes (i.e. habitat classification, shoreline type, etc.).

**Question #6: Do you have adequate personnel and funding to participate in this effort? What personnel/funding levels could you contribute in the shore-term (3-6 months)? Longer term (6-12 months)? Beyond that?**

Discussion from Management Group 1:

- Short term – no.
- Long term – no.
- Beyond that – maybe.

Discussion from Management Group 2:

- Overall, there are no additional personnel and funding sources to dedicate or provide this effort. DOT and/or NOS could provide some technical assistance; NOS could provide historical shorelines, etc.
- There is optimism that the Recreational Fishing License Money could provide some funding opportunities.
- Grad Students are available and affordable labor and should be evaluated as an option.
- Questions that need to be answered include: Who will perform the QA/QC, How do we split the attribution up to different agencies or groups, will ground-truthing be performed and who will do it?
- With a pre-determined set of parameters, there may be opportunities for other GIS staff to comply with those standards on project that they'd be working on anyway.

**Question #7: If not, what resources could you currently (and realistically) provide towards this effort?**

Discussion from Management Group 1:

- The next steps could include a similar workshop like the ESM Summit, but involving local governments, and discussing the resources (data, imagery, etc) that are currently available for this effort. Also, evaluate the possibility of encouraging local governments who are doing their own mapping to use the methodology that we establish.

Discussion from Management Group 2:

- Data we already have: County Imagery, SAV Imagery and data, ECU Neuse data, DOT existing photos, County data, flood plain mapping data.

### Technical Topics/Questions

#### **Question #1: What definition of shoreline should be used to map a “delineated shoreline?”**

Discussion from Technical Group 3:

- We discussed what definition should be used from a feasibility standpoint. There are a lot of definitions for the shoreline based on jurisdictional and datum based lines, but there are only a few that can be delineated from aerial photography. The options were apparent shoreline and water-land or vegetation interface.
- As long as you have a well-defined methodology for the shoreline delineation, it doesn't have a major impact on which shoreline you choose to create your baseline “line.”
- The part that will dictate methodology will be a priority list of imagery to use for the delineation. This priority list will be a standard for those performing the work to follow as to what imagery is the “best available.” This list will be dictated by the purpose of the baseline “line.” For example, if shoreline change rates (analysis) will be completed, you may consider other imagery to be the best available over another.
- If we have a strong methodology, it will encourage participation of other agencies and institutions.

Discussion from Technical Group 4:

- The shoreline delineation is understood to carry no legal boundaries with it.
- Shoreline definitions range for different agencies/institutions. A shoreline delineation methodology or system for how we address different shoreline types may be an option for how to deal with the differences in shoreline type along the entire estuarine system.
  - Marsh – waterward vegetation/water line
  - Swamp forest – apparent shoreline
  - Beach – wet/dry line
  - Etc.
- Other issues to consider include: Where do we stop when we go into smaller and smaller shorelines (ICWW versus mosquito ditches). Would like to see a high ground/marsh interface as well, but this obviously is a separate project for the future.

#### **Question #2: What attributes would your agency want to be associated with this shoreline mapping effort?**

Discussion from Technical Group 3:

- Endless possibilities for attributing, but the following are a few suggestions:
  - Shoreline Classification/Type
  - Source Data - Imagery info, date, etc
  - County
  - Sensor – Camera Type, Source Style, etc

- Interpretation method
- Vulnerability (maybe on a class level)
- Fetch
- Slope

Discussion from Technical Group 4:

- Attributes we feel should be included: hardened or natural shoreline (erosion control structures – including type if possible), shoreline type.

**Question #3: What would the final deliverable look like, and how would it be shared?**

Discussion from Technical Group 3:

- Shapefile on the internet

Discussion from Technical Group 4:

- There will be two user types that will utilize this data: lookers (those that will review the data online) and users (those that will download the data)
  - For the User: A downloadable shapefile
  - For the Looker: Something has a simple viewer
- The data doesn't all have to be in one place. There should be one website that links it all together though.

**Question #4: Does the delineated shoreline need to be collected in one contiguous effort, or could it be compiled from different years, different sources? What are the pros and cons of each?**

Discussion from Technical Group 3:

- Where contiguous would be a preferred option over compiled, if the continuous imagery set isn't the best available data, then it isn't the best option. Ultimately, the only benefit for a contiguous shoreline would be for shoreline change rate analysis. As long as the year of the imagery is easily accessible with the data – it shouldn't matter.
- A priority list of imagery should be completed for use with this project.

Discussion from Technical Group 4:

- A contiguous effort would be preferable but may not be the “best available” source to use based on the imagery available. The best data available is likely to be the non-contiguous imagery.
- A single contiguous shoreline may be beneficial because the second shoreline that gets delineated offers a historical perspective. This would be towards an effort of shoreline change rate analysis.

**Question #5: What photography and scale should be best to utilize for this effort?**

Discussion from Technical Group 3:

- The minimum resolution to work with is imagery with 2-foot pixels. A smaller technical group would be good to set these standards.
- Current photography is best to use, using a priority list of “best available” imagery.
- The scale should range from 1:1000 to 1:2000 for digitizing.

Discussion from Technical Group 4:

- The resolution to work with is imagery with less than 1-meter pixels.

**Question #6: What criteria should be considered when prioritizing the collection of this shoreline? Where should we begin and why?**

Discussion from Technical Group 3:

- We want to project areas prioritized based on available data (imagery). Start with most current imagery available to give other counties with older photography time to catch up.
- Another prioritizing criteria is development/growth. High development/growth counties are done first and move to the least developed/growing counties.

Discussion from Technical Group 4:

- Prioritize counties based upon flying plans for imagery. For example, if a county is projecting to fly the following year – wait until their new imagery is available to delineate that county.
- Potential prioritizing criteria include the following areas:
  - Major inlets
  - High erosion areas
  - High development areas, newly developing areas
  - Beaufort and Pamlico County since ECU is already working on it
  - Carteret and Onslow County since NOAA works frequently in these areas
  - Backside of the barrier islands